

07-SC-01, Project Engineering and Design (PED), 12 GeV CEBAF Upgrade Thomas Jefferson National Accelerator Facility, Newport News, Virginia

1. Significant Changes

This is the initial submission for project engineering and design funding for this project.

2. Design, Construction, and D&D Schedule

(fiscal quarter)

Preliminary Design start	Final Design Complete	Physical Construction Start	Physical Construction Complete	D&D Offsetting Facilities Start	D&D Offsetting Facilities Complete
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FY 2007.....	1Q 2007	4Q 2009	N/A	N/A	N/A	N/A
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3. Baseline and Validation Status^a

(dollars in thousands)

TEC	OPC, except D&D Costs	Offsetting D&D Costs	Total Project Costs	Validated Performance Baseline	Preliminary Estimate
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FY 2007	21,000	11,000	—	32,000	—	32,000
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4. Project Description, Justification, and Scope

This PED request provides Architect-Engineering (A-E) services for the preliminary and final design for the 12 GeV Continuous Electron Beam Accelerator Facility (CEBAF) Upgrade project at the Thomas Jefferson National Accelerator Facility (TJNAF). The design effort will be sufficient to assure project feasibility, define the scope, provide detailed estimates of construction costs based on the approved design, working drawings and specifications, and provide construction schedules including procurements. The design effort will ensure that construction can physically start or long-lead procurement items can be procured to support the 12 GeV CEBAF Upgrade schedule.

The CEBAF at the Thomas Jefferson National Accelerator Facility, or Jefferson Laboratory, is the world-leading facility in the experimental study of hadronic matter. The 12 GeV Upgrade of CEBAF directly supports the Office of Science Nuclear Physics' scientific thrusts. The upgrade is identified as a near-term priority in the Office of Science Twenty-Year Outlook. In addition, the Nuclear Science Advisory Committee (NSAC) in its 1996 Long Range Plan stated that "...the community looks forward to future increases in CEBAF's energy, and to the scientific opportunities that would bring." In its most recent 2002 Long Range Plan, NSAC recommends the 12 GeV Upgrade as one of its highest priorities for the Nuclear Physics program:

^a The estimates in Section 3 are for PED only. The full Total Estimated Cost (TEC design and construction) of the 12 GeV CEBAF Upgrade project at CD-0 ranges between \$205,000,000 and \$275,000,000, escalated from that presented at CD-0 to include increased costs associated with delays in the start of the project, and input from a July 2005 Independent Project Review of the Conceptual Design and associated plans. This estimate is based on pre-conceptual design and should not be construed as a project baseline.

“We strongly recommend the upgrade of CEBAF at Jefferson Laboratory to 12 GeV as soon as possible. The 12 GeV upgrade of the unique CEBAF facility is critical for our continued leadership in the experimental study of hadronic matter. This upgrade will provide new insights into the structure of the nucleon, the transition between the hadronic and quark/gluon description of matter, and the nature of quark confinement.”

The full scope of the proposed project is the accelerator upgrade, a new experimental hall and associated beam-line, and upgrades to the existing three experimental halls. DOE has recently conducted a thorough review of the scientific program of the new and upgraded experimental halls, to articulate the merit of the full accelerator and experimental proposed technical scope. TJNAF is exploring other non-DOE/NP sources of support for the construction of scientific equipment. A better understanding of non-DOE/NP funding contributions will be determined prior to the approval of the alternative selection and cost range (CD-1) and then finalized at the approval of the performance base-line (CD-2). This will provide important input into the final technical scope that will be established at CD-2. The preliminary estimated Total Project Cost (TPC) range is \$225,000,000 to \$300,000,000.

TJNAF is located on 162 acres in Newport News, Virginia. TJNAF was constructed over the period FY 1987-1995 for a cost of \$513 million (Total Project Cost). CEBAF began operations in FY 1995 and is managed by the Southeastern Universities Research Association (SURA). Enhancing the capability of CEBAF is cost effective and builds upon existing infrastructure and capabilities. This project will reduce cost by using the existing systems, facilities, and experience at TJNAF instead of building a new facility with the same requirements at another location. The CEBAF upgrade alternative was chosen because it is more cost effective than building a new facility.

Compliance with Project Management Order

The project is being conducted in accordance with the project management requirements in DOE Order 413.3 and DOE Manual 413.3-1, Program and Project Management for the Acquisition of Capital Assets. The project costs presented in this data sheet are preliminary estimates for project engineering and design only. Plans call for a cost and schedule Performance Baseline to be developed during FY 2007 and approved by the Acquisition Executive at the completion of preliminary design (Critical Decision 2 – Approve Performance Baseline). The preliminary schedule for project Critical Decisions is as follows:

- Critical Decision – 0: Approve Mission Need—2Q FY 2004
- Critical Decision – 1: Approve Preliminary Baseline Range—2Q FY 2006
- Critical Decision – 2A: Approve Long Lead Baseline—4Q FY 2006
- Critical Decision – 3A: Approve Long Lead Procurements—3Q FY 2007
- Critical Decision – 2B: Approve Performance Baseline—4Q FY2007
- External Independent Review Final Report—3Q FY 2007
- Critical Decision – 3B: Approve Start of Construction—4Q FY 2008
- Critical Decision – 4: Approve Start of Operations—1Q FY 2014

5. Financial Schedule

(dollars in thousands)

Appropriations	Obligations	Costs
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Design by Fiscal Year

2007.....	7,000	7,000	5,600
2008.....	12,000	12,000	11,000
2009.....	2,000	2,000	4,000
2010.....	—	—	400
Total, Design	21,000	21,000	21,000

6. Details of Project Cost Estimate

Total Estimated Costs

(dollars in thousands)

Current Estimate	Previous Estimate
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Preliminary and Final Design..... 21,000 N/A

Other Project Costs

(dollars in thousands)

Current Estimate	Previous Estimate
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Conceptual Planning 11,000 N/A

7. Schedule of Project Costs

(dollars in thousands)

	Prior Years	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Outyears	Total
TEC (Design)	—	5,600	11,000	4,000	400	—	—	21,000
OPC (Design).....	7,455	2,500	1,045	—	—	—	—	11,000
Total, Project Costs (Design).....	7,455	8,100	12,045	4,000	400	—	—	32,000

8. Related Operations and Maintenance Funding Requirements

Not applicable for project engineering and design.

(Related Funding Requirements)

Not applicable for project engineering and design.

9. Required D&D Information

Not applicable for project engineering and design.

10. Acquisition Approach

Design and inspection of the facilities and equipment will be by the operating contractor and Architect-Engineer (A-E) subcontractor as appropriate. A-E design services will be done by a combination of TJNAF and competitively bid lump sum contracts administered by the TJNAF. Preference will be given to procurements accomplished by fixed-price contracts awarded on the basis of competitive bidding. Project and design management, inspection, coordination, tie-ins, testing and checkout witnessing, and acceptance will be performed by the TJNAF operating contractor.